

**S3 APPENDIX Characteristics of retracted COVID-19 articles (N=46)**
**(References are listed below the table)**

Reference	Version(s) available at source journal or preprint server at 05 September 2020	Retractor	Paper source (journal or preprint server)	Study type	Retraction reason	Comments
Adjodah et al. 2020 [1] (USA)	<a href="#">Retraction notice</a> and <a href="#">full text with all pages clearly watermarked "Withdrawn"</a> available at medRxiv preprint server (via Google Scholar)	Authors	medRxiv preprint server	Analysis of existing epidemiological datasets	Increased rates of SARS Cov-2 in the areas originally analysed; authors will provide new analyses to address this	Original unmarked abstract available in <a href="#">WHO COVID literature collection</a> at 19th December 2020
Alhowary et al. 2020 [2] (Jordan)	Only the <a href="#">retraction notice</a> is available at the journal website	Authors and/or journal	Annals of Medicine and Surgery	Case series	Not stated	Original unmarked full text available on <a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020
An et al. 2020 [3] (China)	<a href="#">Retraction notice</a> and <a href="#">original unmarked abstract</a> available at journal website. Abstract page of journal states a retraction has been published but access to the retraction notice and the full text article requires a subscription	Authors	Annals of Clinical and Laboratory Science (not open access)	Case series	Major error in data entry for analysis	Original unmarked abstract still available at journal website (see left) and on <a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020
Argyropoulos et al. 2020 [4] (USA)	The <a href="#">retraction notice</a> [5] and <a href="#">original article which was duplicated</a> are available at the journal website	Journal	American Journal of Pathology	Retrospective analysis	Accidental duplicate publication	

Reference	Version(s) available at source journal or preprint server at 05 September 2020	Retractor	Paper source (journal or preprint server)	Study type	Retraction reason	Comments
Bae et al. 2020 [6] (S Korea)	<a href="#">Retraction notice</a> [7] and marked full text available at journal website:  <a href="#">Original online full text with single one-line “retracted” statement above abstract</a>  <a href="#">Original PDF full text with all pages watermarked “retracted”</a>	Journal	Annals of Internal Medicine	Prospective controlled comparison	Data reporting error	
Beato-Vibora 2020 [8] (Spain)	<a href="#">Retraction notice</a> and the <a href="#">original PDF full text, with “Retracted:” added to the article title</a> available at the journal website [8]	Journal	Diabetes Technology & Therapeutics	Before-after study	Violation of publication ethics	<a href="#">Study reported in detail in Medscape</a> Without indication of retraction at 19 <sup>th</sup> December 2020. Note added in Medscape by 6 <sup>th</sup> January 2021 that the cited study had been retracted.
Bility et al. 2020 [9] (USA)	Only the <a href="#">retraction notice</a> [9] is available at the journal website	Authors and editors	Science of the Total Environment	Comparative/ correlative study of	Not stated	Original unmarked full text available on

Reference	Version(s) available at source journal or preprint server at 05 September 2020	Retractor	Paper source (journal or preprint server)	Study type	Retraction reason	Comments
				relationship of COVID-19 to geologic factors		<a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020
Cercy 2020 [10] (USA)	<a href="#">Original abstract, headed "withdrawn"</a>  <a href="#">Original PDF full text, unmarked</a>	Authors	Preprint server (medRxiv)	Medical record review	Privacy issues regarding study conduct (contested by author)	Original unmarked full text available on the preprint server (see left) and on <a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020
Chen et al. 2020 [11] (multi-national)	3 original versions of abstract, all headed "withdrawn" ( <a href="#">v1</a> , <a href="#">v2</a> , <a href="#">v3</a> )  3 original PDF versions of retracted full text, all unmarked ( <a href="#">v1</a> , <a href="#">v2</a> , <a href="#">v3</a> ).	Authors	Preprint server (bioRxiv)	Prediction model	Lack of full author consent	Original unmarked full text available on <a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020
Chen et al. 2020 [12] (China)	Only the <a href="#">retraction notice</a> [12] is available at the journal website	Authors	Liver International (published online as an accepted article)	Unclear - we do not have access to the full text.	<a href="#">Authors decided on reflection that the opinions expressed were incomplete</a> [12]  NB original first author was Chen but subsequent	Journal site reports original article cited in two research papers [13, 14]

Reference	Version(s) available at source journal or preprint server at 05 September 2020	Retractor	Paper source (journal or preprint server)	Study type	Retraction reason	Comments
					correspondence refers to Zhou (corresponding author)	
Chu et al. 2020 [15] (multi-national)	<a href="#">Original abstract, headed “withdrawn”</a>  <a href="#">Original PDF full text, all pages watermarked “withdrawn”</a>  Original supplementary material, unmarked ( <a href="#">file 1</a> , <a href="#">file 2</a> )	Authors	Preprint server (bioRxiv)	Molecular simulation study	To conduct further verification experiments	Original unmarked abstract available on <a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020
Davido et al. 2020 [16] (France)	<a href="#">Original abstract, headed “withdrawn”</a>  <a href="#">Original PDF full text, unmarked</a>	Authors	Preprint server (medRxiv)	Retrospective comparison	To revise after peer review following hydroxychloroquine controversy	Original unmarked full text available on the preprint server (see left) at 13 <sup>th</sup> December 2020
Dumantepe et al. 2020 [17]	Only the <a href="#">retraction notice</a> is available at the journal website	Authors	Heart, Lung and Circulation	Unknown. Full text not available	Not stated. A <a href="#">temporary removal notice on PMC</a> states the reason for	Original unmarked abstract still available at

Reference	Version(s) available at source journal or preprint server at 05 September 2020	Retractor	Paper source (journal or preprint server)	Study type	Retraction reason	Comments
(Turkey)	(withdrawn article marked in press)				removal will be specified in the replacement article, or the article will be reinstated.	<a href="#">ClinOwl</a> website at 19 <sup>th</sup> December 2020
El Assaad et al. 2020 [18] (USA)	The <a href="#">retraction notice</a> and the <a href="#">original article</a> are available at the journal website	Journal	JACC Case Reports	Case study	Accidental duplicate publication	
Etemadifar et al. 2020 [19] (Iran)	Only the <a href="#">retraction notice</a> is available at the journal website	Authors and Editor	Revue Neurologique (published online as an accepted article)	Unclear - we do not have access to the full text.	Not stated	Original unmarked abstract <a href="#">available online at Chinese website</a>
Fioranelli et al. 2020 [20] (multi-national)	Only <a href="#">retraction notice</a> is available at the journal website	Journal	Journal of Biological Regulators & Homeostatic Agents	Theoretical study/review badged as an editorial	Manipulation of the peer review  <a href="#">Science Integrity Digest blog (with archive of the original full text)</a>	Original unmarked full text available from multiple online sites: 47 cites on 5 <sup>th</sup> September 2020 and 60 sites on 19 <sup>th</sup> December 2020 and 26 <sup>th</sup> June 2021 as listed in Google Scholar (see Appendix 4).

Reference	Version(s) available at source journal or preprint server at 05 September 2020	Retractor	Paper source (journal or preprint server)	Study type	Retraction reason	Comments
						Original unmarked abstract available in <a href="#">WHO COVID literature collection</a> and on <a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020
Gaibazzi et al. 2020 [21] (multi-national)	2 original versions of abstract, both headed “withdrawn” ( <a href="#">v1</a> , <a href="#">v2</a> )  2 original PDF versions of retracted full text, both unmarked ( <a href="#">v1</a> , <a href="#">v2</a> )  <a href="#">Original supplementary material, unmarked</a>	Authors (as requested by their IRB)	Preprint server (medRxiv)	Retrospective case series	Objectives not approved by local IRB	Original full text available on the preprint server (see left) and <a href="#">ResearchGate</a> as unretracted version at 19 <sup>th</sup> December 2020
Gaibazzi et al. 2020 [22] (multi-national)	2 original versions of abstract, both headed “withdrawn” ( <a href="#">v1</a> , <a href="#">v2</a> )  2 original PDF versions of retracted full text, both unmarked ( <a href="#">v1</a> , <a href="#">v2</a> )	Authors	Preprint server (medRxiv)	Retrospective case series	Objectives not approved by local IRB	<a href="#">Study reported in detail by national newspaper</a> [23]  Original full text available on the preprint server (see left) at 19 <sup>th</sup> December 2020

Reference	Version(s) available at source journal or preprint server at 05 September 2020	Retractor	Paper source (journal or preprint server)	Study type	Retraction reason	Comments
Hedima et al. 2020 [24] (Nigeria)	<a href="#">Retraction notice</a> [25] plus the <a href="#">original article which had been duplicated</a> available at journal website	Journal	Research in Social and Administrative Pharmacy	Narrative review	Accidental duplicate publication	
Huang & Zhao 2020 [26] (China)	<a href="#">Full text available at journal website with all pages clearly watermarked "Retracted"</a>  (duplicate of another paper [27])	Authors and Editor	Psychology, Health and Medicine	Web-based cross-sectional survey	<a href="#">Duplicate publication and failure of one author to satisfy authorship criteria</a> [28] (October 2020)	Triple publication - same as Huang & Zhao [29]
Huang & Zhao 2020 [29] (China)	<a href="#">Full text available at journal website with all pages clearly watermarked "Retracted"</a>  (duplicate of another paper [27])	Editor in Chief	Asian Journal of Psychiatry	As above – same study	<a href="#">Duplicate publication</a> [30] (June 2020)	Triple publication – same as Huang & Zhao [26]
Irshad et al. [31] (Pakistan)	Only <a href="#">retraction notice</a> [31] is available at the journal website	Journal	International Journal of Mental Health Nursing	Online cross-sectional survey	Reuse of a copyrighted questionnaire without permission	Original unmarked full text available on <a href="#">PubMed Central</a> and

Reference	Version(s) available at source journal or preprint server at 05 September 2020	Retractor	Paper source (journal or preprint server)	Study type	Retraction reason	Comments
						original abstract available on <a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020
Kanwar 2020 [32] (USA)	<a href="#">Retraction notice only available on PubMed</a> ; no information at the journal website	Journal	American Journal of Respiratory & Critical Care Medicine	Unclear - full text not available	Not stated	Original unmarked abstract available on <a href="#">ClinOwl</a> at 19 <sup>th</sup> December 2020
Karami et al. 2020 [33] (Iran)	None	Authors	Travel Medicine and Infectious Disease	Case study	Failure to demonstrate first event	Original unmarked abstract available on <a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020
Kim et al. 2020 [34] (S Korea)	<a href="#">Original abstract, headed "withdrawn"</a>  <a href="#">Original PDF full text, unmarked</a>	Authors	Preprint server (medRxiv)	Retrospective cohort study	Due to "controversy about HCQ and potential changes to results after peer review"	Original unmarked full text available on the preprint server (see left) at 19 <sup>th</sup> December 2020
Kumar 2020 [35] (India)	None	No information	Journal of Molecular Pharmaceuticals and Regulatory Affairs	No information	No information	Unclear



Reference	Version(s) available at source journal or preprint server at 05 September 2020	Retractor	Paper source (journal or preprint server)	Study type	Retraction reason	Comments
Luowei et al. 2020 [36] (China)	<a href="#">Original abstract [in Chinese], headed “withdrawn”</a>	Journal	Practical Preventive Medicine	Case series	No information	Study was described in considerable full-page detail in national newspapers <a href="#">[37, 38]</a>
Maltezou et al. 2020 [39] (Greece)	Only the retraction notice was available at the journal website at 19 <sup>th</sup> December 2020; however, this had been removed and a <a href="#">version of the full text had been reinstated</a> without any accompanying explanation by 6 <sup>th</sup> January 2021	Not reported	Journal of Hospital Infection	Unknown. Abstract and full text not available	Not stated. A temporary removal notice was present on Pubmed at 19 <sup>th</sup> December 2020 but had been removed by 6 <sup>th</sup> January 2021.	The temporary removal notice stated the reason for removal would be specified in the replacement article, or the article would be reinstated, but no explanation was provided
Mehra et al. 2020 [40] (USA)	<a href="#">Original online full text with all pages watermarked “retracted”</a>  <a href="#">Original PDF full text with all pages watermarked “retracted”</a>	Authors (following journal <a href="#">Expression of concern</a> [41])	Lancet	Multinational registry analysis	Data veracity concerns	<a href="#">Impact on WHO international hydroxy-chloroquine trial</a> [42]

Reference	Version(s) available at source journal or preprint server at 05 September 2020	Retractor	Paper source (journal or preprint server)	Study type	Retraction reason	Comments
Mehra et al. 2020 [43] (USA)	<a href="#">Original online full text with narrow “retracted” banner on home page (article itself unmarked)</a>  <a href="#">Original PDF full text with “retracted” statement at top of first page</a>	Authors (following journal <a href="#">Expression of concern</a> [44] )	New England Journal of Medicine	Multinational registry analysis	Ditto, same study	Cited before retraction in <a href="#">NEJM editorial</a> [45] which had not been altered at 19 <sup>th</sup> December 2020  <a href="#">Temporarily cited by WHO guidelines</a> [46]
Mulvey et al. 2020 [47] (USA)	<a href="#">Retraction notice</a> plus <a href="#">the original article which had been duplicated</a> available at journal website	Publisher	Annals of Diagnostic Pathology	Case series	<a href="#">Accidental duplication of an article already published in the same journal by the same authors (slightly different title)</a>	Original unmarked abstract still available on <a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020
Nouvier et al. 2020 [48] (France)	<a href="#">Original PDF [in English and French], watermarked “retracted”</a>	Authors	Bulletin de la Dialyse à Domicile	Case study	Suspected false positive result	
Parves et al. 2020 [49] (Bangladesh)	<a href="#">Original abstract, headed “withdrawn”</a>  <a href="#">Original PDF full text, all pages watermarked “withdrawn”</a>	Authors	Preprint server (bioRxiv)	Molecular analysis	Lack of consent to use data	

Reference	Version(s) available at source journal or preprint server at 05 September 2020	Retractor	Paper source (journal or preprint server)	Study type	Retraction reason	Comments
Patel et al. 2020 [50] (USA)	None ( <a href="#">NB: Original PDF of full text available from alternative online source, all pages watermarked "retracted"</a> )	Authors	Preprint server (SSRN)	Multinational registry analysis	No information	Controversial link to Surgisphere company implicated in research misconduct [51]
Patel et al. 2020 [52] (USA)	None	Authors	Preprint server (SSRN)	Multinational registry analysis	No information	Ditto [51]  <a href="#">Original unmarked full text available at alternative online source</a> at 19 <sup>th</sup> December 2020
Pradhan et al. 2020 [53] (India)	<a href="#">Original abstract, headed "withdrawn"</a>  <a href="#">Original PDF full text, all pages watermarked "withdrawn"</a>	Authors	Preprint server (bioRxiv)	Genomic analysis	To revise based on feedback	Original unmarked full text available on <a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020  Among the top 10 COVID-19 preprints tweeted up to 30 <sup>th</sup> April 2020 [54]

Reference	Version(s) available at source journal or preprint server at 05 September 2020	Retractor	Paper source (journal or preprint server)	Study type	Retraction reason	Comments
Raharusuna et al. 2020 [55] (Indonesia)	None	No information	Preprint server (SSRN)	Retrospective cohort study	No information	<a href="#">Original PDF full text available, unmarked, at alternative online source</a> at 19 <sup>th</sup> December 2020
Singh et al. 2020 [56] (India)	<a href="#">Full text available at journal website with all pages clearly watermarked "Retracted"</a>	Editorial Board and Publication Ethics Committee	Korean Journal of Anesthesiology	Brief narrative review	<a href="#">Plagiarism</a> (September 2020)	
Siyu et al. 2020 [57] (China)	<a href="#">Original abstract, headed "withdrawn"</a>  <a href="#">Original PDF full text, unmarked</a>	Authors	Preprint server (medRxiv)	Online questionnaire survey	To conduct further verification experiments	Original unmarked full text available on the preprint server (see left) and <a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020
Vavougiou 2020 [58] (Greece)	Only the <a href="#">retraction notice</a> is available at the journal website	Authors and/or editor	Free Radical Biology and Medicine	Gene sequencing study	Not stated	Original unmarked abstract available on <a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020
Wang et al. 2020 [59] (China)	None	No information	Zhonghua Er Ke Za Zhi	Case series/registry analysis	No information	Original unmarked abstract available (in Chinese) on <a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020

Reference	Version(s) available at source journal or preprint server at 05 September 2020	Retractor	Paper source (journal or preprint server)	Study type	Retraction reason	Comments
Wang et al. 2020 [60] (multi-national)	<a href="#">Original PDF full text with all pages watermarked "retracted"</a>	Authors	Cellular & Molecular Immunology	In vitro immunology study	<a href="#">Major flaw in methodology</a>	
Wei et al. 2020 [61] (China)	Only the <a href="#">retraction notice</a> is available at the journal website	Authors and/or editor	Clinical Imaging	Retrospective imaging case series analysis	Not stated but appears to be a duplicate of an <a href="#">article in Journal of X-Ray Science &amp; Technology</a>	Original unmarked abstract in Clinical Imaging journal available from <a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020
Yang et al. 2020 [62] (multi-national)	<a href="#">Original abstract, headed "withdrawn"</a>  <a href="#">Original PDF full text, unmarked</a>  <a href="#">Original supplemental material, unmarked</a>	Authors	Preprint server (medRxiv)	Case registry analysis	To revise with more up to date data	Original unmarked full text available on the preprint server (see left) at 19 <sup>th</sup> December 2020  Among the top 10 COVID-19 preprints cited up to 30 <sup>th</sup> April 2020 [54]
Zhang et al. 2020 [63] (China)	Only the <a href="#">retraction notice</a> is available at the journal website	Journal	International Journal of Nursing Studies	Cross-sectional survey	Not stated	Original unmarked abstract available on <a href="#">ResearchGate</a> at 19 <sup>th</sup> December 2020

Reference	Version(s) available at source journal or preprint server at 05 September 2020	Retractor	Paper source (journal or preprint server)	Study type	Retraction reason	Comments
Zhuang et al. 2020 [64] (China)	None	Journal  From the abstract/editor office's response: The article was decided to be offline by the editorial board from the pre-publish lists.	Chinese Journal of Epidemiology [in Chinese]	Test accuracy study	Conclusions were based on theory not field epidemiology data & thus further research needed.	Cited by the US White House Coronavirus Task Force. [65]

# **References** (NB reference numbers in this appendix differ from those in the main paper)

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